



Serial No. 2691
(B.g.7)

ICNAF Res.Doc. 72/8
(also ICNAF SAC No. 72/7
- Revised)

ANNUAL MEETING - JUNE 1972

PRELIMINARY RESULTS OF GEORGES BANK-GULF OF MAINE

ICNAF LARVAL HERRING CRUISE, DELAWARE II,

21 SEPTEMBER - 4 OCTOBER 1971

by
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INTRODUCTION

At the annual meeting of ICNAF held in June 1971 it was decided to run a multi-ship, cooperative ICNAF Joint Survey to study the distribution, abundance, and dispersal of herring larvae in the Georges Bank-Gulf of Maine area. A series of cruises, both inshore and offshore, were conducted in the autumn of 1971.

In this document we present the preliminary results of the second of five cruises that were conducted over a standard cruise tract in the Georges Bank-Gulf of Maine area (Fig. 1). The sampling was carried out aboard the USA research vessel, DELAWARE II, during the period 21 September-4 October.

This 1971 survey is a continuation of ICNAF cooperative effort on Herring Spawning Surveys in the Georges Bank-Gulf of Maine area which started in the autumn of 1969 (Anthony, Sauskan, and Sigaev) and expanded in 1970 (Graham and Chenoweth). Additional recent investigations of larval herring distribution and abundance in this survey area include those conducted in the late 1950's (Tibbo, Legare, Scattergood and Temple, 1958 and Tibbo and Legare, 1960) and again in the 1960's (Boyar, 1966 and Das, 1968).

METHODS

At each designated station a tow was made at 3.5 knots using paired 60 cm. bongo ichthyoplankton samplers equipped with nets of .333 and .505 m. mesh openings, respectively. The sampling was conducted down to 200 meters water depth, or at shallower stations, as close to the bottom as was practical. During each tow the bongo gear was deployed at 50 m./min. and retrieved at 20 m./min. During retrieval on each tow the upper 40 meters of the water column was sampled in 20 steps, separated by 2-meter intervals, with one minute at each step. Flow meters were used to measure the amount of water filtered by the nets.

The plankton samples were examined in the laboratory under a dissecting microscope and all the fish eggs and larvae in the sample were removed. The standard length of each herring larva was measured to the nearest millimeter. In samples that contained large numbers of herring larvae, only a random sample of one hundred were measured. In this report, only herring larvae captured in the .505 m. net have been examined. The catch is expressed as the number of herring larvae captured per 1000 cubic meters of water strained.

RESULTS

A total of 11,335 larval herring were captured in the .505 m. mesh 60 cm. bongo nets during this cruise. With the exception of four larvae taken at three stations south of Nantucket Shoals all of the larvae taken were located in two distinct, widely separated geographical areas; Northern Georges Bank, and along the southwest coast of Nova Scotia (Fig. 2). This widely separated distribution pattern agrees with the surveys of the late 1950's reported on by Tibbo et al. (1958).

The largest concentration of larval herring was found on northern Georges Bank. A total of 8860 larvae were captured in this area. Most of the larvae fell into one size group with a mode at 6 mm. (Fig. 3). Another size group with a mode at 15 mm. was distinguishable but comprised of very few larvae. There were 8151 of the smaller sized larvae and 709 of the larger sized. Off the southwestern coast of Nova Scotia a total of 2475 larvae were taken. Here the larvae were much longer with a single mode at 12 mm. Only 263 larvae with a length of 9 mm. or less were taken in this area.

On the Northern Edge of Georges Bank herring larvae were found at 26 different sampling locations. The catch rate of the herring larvae taken in these 26 tows averaged 400 per 1000 m.³ of water strained and ranged from <1 to 4369 per 1000 m.³. In the other geographical area, the southwestern coastal area of Nova Scotia, herring larvae were taken at seven different stations and the catch rate average for these seven positive tows was 401 per 1000 m.³ with a range of 3 to 1644 per 1000m.³.

DISCUSSION

Larval herring taken on the cruise were from two separate geographical areas and had distinctly different size modes. This suggests that the larvae originated from two groups of spawning fish, one on northern Georges Bank and the other off the southwest coast of Nova Scotia. The size of the larvae from the two areas suggests earlier spawning off southwest Nova Scotia.

In Boothbay Harbor, Maine during May 1971 a workshop meeting will bring together all of the various participating scientists who were involved in the 1971 Cooperative ICNAF Joint Survey. We anticipate that a comprehensive paper will result from pooling the data collected by the various participants.

LITERATURE CITED

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Table 1. Summary of station data from DELAWARE II cruise
21 September-4 October 1971.

Station number	Date Collected	Number herring	Water strained m. ³	No./1000m. ³ water strained	Latitude	Longitude	Station depth fm.
2	10-1-71	0	1232.1		41°-35'N	69°-20'W	122.5
3	9-23-71	0	1568.1		41°-46'N	68°-30'W	175.6
4	9-24-71	0	1017.8		41°-49'N	68°-00'W	64.0
5	9-24-71	143	995.5	143.6	41°-50'N	67°-21'W	49.4
6	9-24-71	3683	842.9	4368.9	41°-52'N	66°-45'W	60.3
7	9-24-71	1	1115.2	0.9	41°-57'N	66°-10'W	89.6
8	9-24-71	0	2023.9		42°-00'N	65°-30'W	797.0
9	9-24-71	0	1015.7		42°-30'N	65°-30'W	98.8
10	9-24-71	0	1297.0		43°-00'N	65°-30'W	124.4
11	9-25-71	0	807.5		43°-15'N	65°-40'W	49.4
12	9-25-71	1390	845.4	1644.2	43°-30'N	66°-12'W	56.7
13	9-25-71	48	1058.0	95.4	43°-12'N	66°-00'W	73.2
14	9-25-71	0	972.3		43°-00'N	66°-00'W	109.7
15	9-25-71	0	921.2		42°-45'N	66°-00'W	69.5
16	9-25-71	0	1552.0		42°-30'N	66°-00'W	175.6
17	9-25-71	0	1791.3		42°-15'N	66°-00'W	246.9
18	9-25-71	0	1239.1		42°-00'N	66°-00'W	100.6
19	9-25-71	1	1599.0	0.6	41°-45'N	66°-00'W	102.4
20	9-25-71	0	1583.6		41°-30'N	66°-00'W	144.5
21	9-25-71	0	2070.3		41°-15'N	66°-00'W	1646.0
22	9-25-71	0	1397.6		41°-00'N	66°-30'W	159.1
23	9-26-71	5	1167.0	4.3	41°-15'N	66°-30'W	91.4
24	9-26-71	653	1118.5	583.8	41°-30'N	66°-30'W	89.6
25	9-26-71	53	1011.3	52.4	41°-45'N	66°-30'W	75.0
26	9-26-71	2	1044.9	1.9	42°-00'N	66°-30'W	82.3
27	9-26-71	0	1795.6		42°-15'N	66°-30'W	232.3
28	9-26-71	0	1858.1		42°-30'N	66°-30'W	259.7
29	9-26-71	0	1149.1		42°-45'N	66°-30'W	142.6
30	9-26-71	0	1563.1		43°-00'N	66°-30'W	137.2
31	9-26-71	0	953.7		43°-15'N	66°-30'W	65.8
32	9-26-71	0	1210.9		43°-30'N	66°-30'W	100.6
33	9-26-71	895	916.8	976.2	43°-46'N	66°-31'W	100.6
34	9-27-71	3	896.8	3.3	44°-00'N	66°-30'W	89.6
35	9-27-71	12	1999.0	6.0	44°-25'N	66°-30'W	201.2
36	9-27-71	16	1078.0	14.8	44°-25'N	67°-00'W	Not recorded
37	9-27-71	135	1124.4	120.0	44°-00'N	67°-00'W	151.8
38	9-27-71	0	1641.2		44°-00'N	67°-30'W	206.7
39	9-27-71	0	1885.1		43°-45'N	67°-30'W	223.1
40	9-27-71	0	1517.5		43°-45'N	67°-00'W	157.3
41	9-27-71	0	1876.0		43°-30'N	67°-00'W	199.3
42	9-27-71	0	1762.7		43°-30'N	67°-30'W	123.1
43	9-27-71	0	1670.8		43°-15'N	67°-30'W	193.8
44	9-28-71	0	1792.4		43°-15'N	67°-00'W	175.6
45	9-28-71	0	1996.4		43°-00'N	67°-00'W	199.3
46	9-28-71	0	2144.6		42°-45'N	67°-00'W	210.3
47	9-28-71	0	1826.8		42°-30'N	67°-00'W	312.7
48	9-28-71	0	1928.4		42°-15'N	67°-00'W	239.6
49	9-28-71	2829	857.2	3300.3	42°-00'N	67°-00'W	56.7
50	9-28-71	474	913.1	519.1	41°-45'N	67°-00'W	49.4
51	9-28-71	321	930.7	344.9	41°-30'N	67°-00'W	62.2
52	9-28-71	345	1070.4	322.3	41°-15'N	67°-00'W	64.0
53	9-28-71	34	1043.7	325.8	41°-00'N	67°-00'W	71.3
54	9-28-71	0	1261.7		40°-45'N	67°-00'W	104.2
55	9-28-71	0	1764.3		40°-30'N	67°-00'W	914.0
56	9-29-71	0	1408.1		40°-30'N	67°-30'W	128.0
57	9-29-71	0	1089.4		40°-45'N	67°-30'W	86.0
58	9-29-71	4	977.4	4.1	41°-00'N	67°-30'W	67.7
59	9-29-71	169	915.6	184.6	41°-15'N	67°-30'W	45.7
60	9-29-71	10	936.1	10.7	41°-31'N	67°-30'W	49.4

Table 1. (cont'd)

Station number	Date Collected	Number herring	Water strained m. ³	No./1000m. ³ water strained	Latitude	Longitude	Station depth fm.
61	9-29-71	10	751.4	13.3	41°-45'N	67°-30'W	45.7
62	9-29-71	0	980.1		41°-56'N	67°-30'W	54.9
63	9-29-71	0	2045.7		42°-15'N	67°-30'W	256.0
64	9-29-71	0	2266.3		42°-30'N	67°-30'W	263.3
65	9-29-71	0	1672.6		42°-30'N	68°-00'W	201.2
66	9-29-71	0	1855.2		42°-15'N	68°-00'W	195.7
67	9-29-71	0	1804.6		42°-00'N	68°-00'W	186.5
68	9-30-71	1	852.1	1.2	41°-50'N	68°-30'W	54.9
70	9-30-71	124	767.1	161.6	41°-15'N	67°-59'W	65.8
71	9-30-71	36	861.1	41.8	41°-00'N	68°-00'W	49.4
72	9-30-71	0	1113.5		40°-45'N	68°-00'W	75.0
73	9-30-71	0	1298.5		40°-30'N	68°-00'W	115.2
74	9-30-71	0	1030.9		40°-30'N	68°-30'W	80.5
75	9-30-71	6	902.1	6.7	40°-45'N	68°-30'W	56.7
76	9-30-71	0	688.0		41°-02'N	68°-31'W	40.2
77	9-30-71	2	975.5	2.0	41°-15'N	68°-30'W	54.9
78	9-30-71	0	1107.9		41°-30'N	68°-30'W	87.8
79	9-30-71	0	1929.0		41°-45'N	68°-30'W	171.9
80	9-23-71	0	1497.0		42°-00'N	68°-30'W	177.4
81	9-23-71	0	1662.2		42°-15'N	68°-30'W	170.1
82	9-23-71	0	2033.0		42°-30'N	68°-30'W	219.5
83	9-23-71	0	1824.5		42°-30'N	69°-00'W	193.8
84	9-23-71	0	1934.4		42°-30'N	69°-30'W	274.3
85	9-23-71	0	1608.7		43°-00'N	69°-29'W	157.3
86	9-23-71	0	1408.6		43°-30.5'N	69°-30'W	135.3
87	9-22-71	0	Not reliable		43°-30'N	70°-00'W	100.6
88	9-22-71	0	1716.9		43°-15'N	70°-00'W	139.0
89	9-22-71	0	1838.3		43°-00'N	70°-00'W	133.5
90	9-22-71	0	2216.9		43°-00'N	70°-15'W	164.6
91	9-22-71	0	1593.4		42°-45.5'N	70°-15'W	104.2
92	9-22-71	0	2517.6		42°-45'N	70°-00'W	177.4
93	9-22-71	0	2007.3		42°-30'N	70°-00'W	155.4
94	9-21-71	0	1661.4		42°-15'N	69°-59'W	118.9
95	18-1-71	0	1415.4		42°-00'N	69°-00'W	135.3
96	10-1-71	0	1666.1		41°-45'N	69°-00'W	160.9
97	10-1-71	0	1456.6		41°-30'N	69°-00'W	150.0
98	10-1-71	0	1452.2		41°-15'N	69°-00'W	144.5
99	10-1-71	0	1062.9		41°-00'N	69°-00'W	80.5
100	10-2-71	0	1027.6		40°-45'N	69°-00'W	69.5
101	10-2-71	2	1011.7	2.0	40°-30'N	69°-00'W	73.2
102	10-2-71	0	1177.0		40°-15'N	69°-00'W	102.4
103	10-2-71	0	980.0		40°-15'N	69°-30'W	78.6
104	10-2-71	0	1184.6		40°-30'N	69°-30'W	62.2
105	10-1-71	0	924.2		40°-47'N	69°-26'W	43.9
106	10-1-71	0	889.1		40°-55'N	69°-32'W	43.9
107	10-1-71	0	868.4		41°-15'N	69°-25'W	47.5
108	10-1-71	0	1037.2		41°-32'N	69°-30'W	43.9
109	10-1-71	0	1826.6		41°-45'N	69°-30'W	173.7
110	10-1-71	0	833.9		41°-35'N	69°-40'W	43.9
113	10-2-71	0	1016.3		40°-40'N	70°-00'W	51.2
114	10-2-71	0	988.1		40°-30'N	70°-00'W	64.0
115	10-2-71	0	1306.6		40°-00'N	70°-00'W	91.4
116	10-2-71	0	2059.2		40°-00'N	70°-00'W	162.8
117	10-2-71	1	2000.5	0.5	40°-00'N	70°-30'W	384.0
118	10-2-71	0	1654.1		40°-00'N	71°-00'W	338.0
119	10-3-71	2	1079.6	1.9	40°-30'N	71°-00'W	76.8
120	10-3-71	0	1040.6		40°-30'N	70°-30'W	71.3
121	10-3-71	0	1078.9		40°-45'N	70°-30'W	54.9
122	10-3-71	1	1273.6	0.8	40°-45'N	71°-00'W	56.7
123	10-3-71	0	901.2		41°-00'N	71°-00'W	47.5
124	10-3-71	0	477.5		41°-08'N	70°-48'W	34.7
125	10-3-71	0	525.8		41°-12'N	70°-40'W	29.3
126	10-3-71	0	687.2		41°-15'N	71°-04'W	40.2

Table 2. Length frequencies of larval herring captured by
DELAWARE II 21 September-4 October 1971.

Size standard length mm.	Georges Bank		Southwestern Coast of Nova Scotia	
	Number	Percent	Number	Percent
4	103	1.2		
5	331	3.7	1	0.04
6	2571	29.0	18	0.7
7	2408	27.2	2	0.08
8	982	11.1	35	1.4
9	936	10.6	207	8.4
10	472	5.3	205	8.3
11	220	2.5	505	20.4
12	128	1.4	577	23.3
13	101	1.1	284	11.5
14	144	1.6	141	5.6
15	236	2.7	236	9.5
16	147	1.6	195	7.9
17	54	0.6	11	0.4
18	12	0.1	6	0.2
19	8	0.09	16	0.6
20	5	0.06	1	0.04
21	1	0.01	1	0.04
22	1	0.01	18	0.7
23			15	0.6
24			1	0.04
No.	8860		2475	

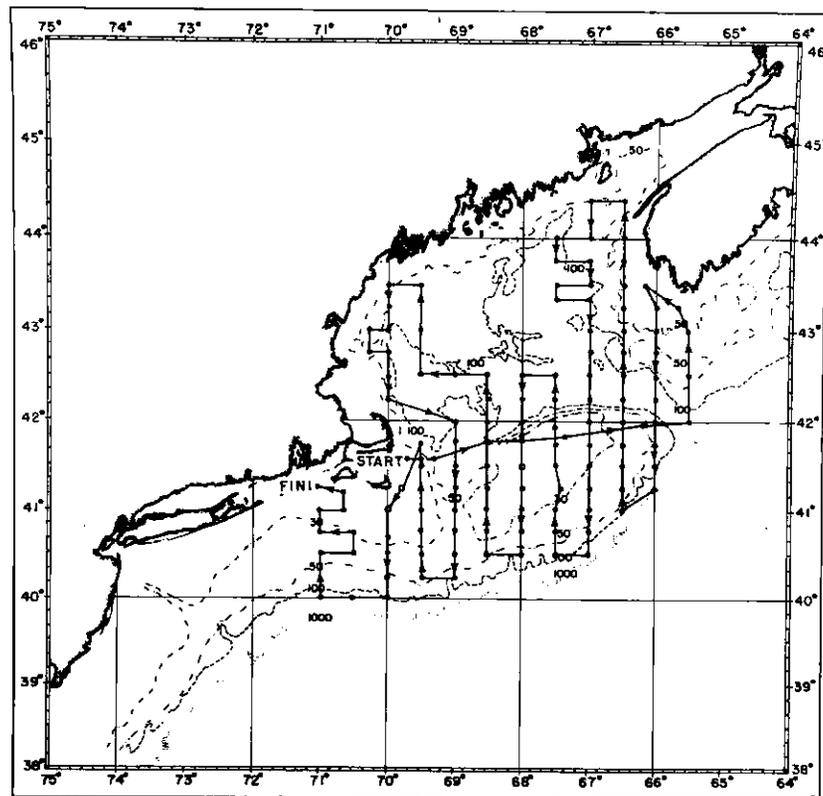


Figure 1. Cruise tract and ichthyoplankton stations - ICAF
Cooperative larval herring survey, 1971.

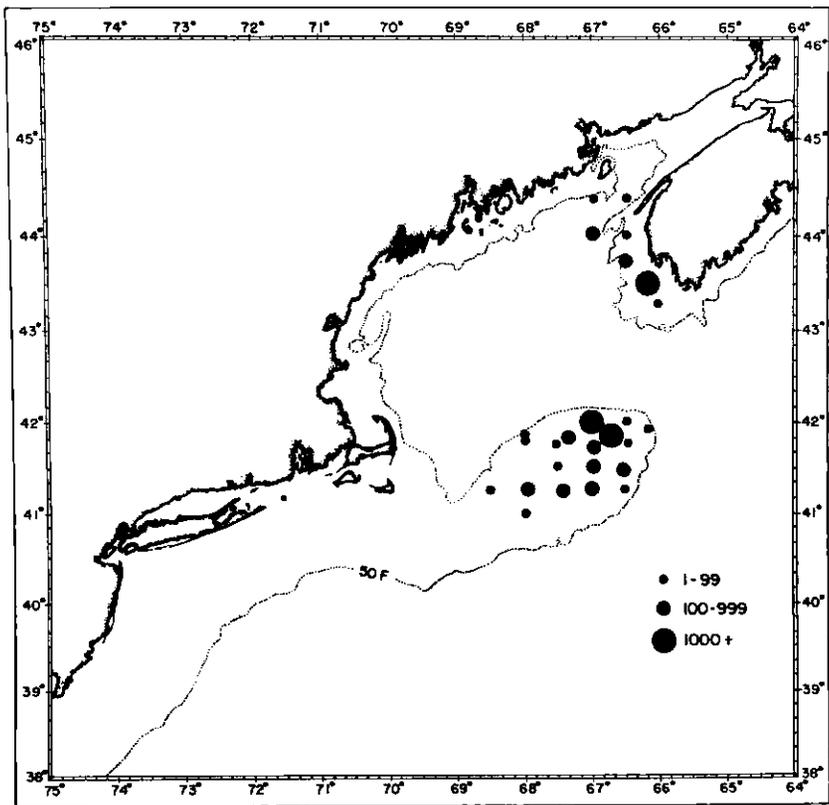


Figure 2. Distribution and abundance of larval herring captured by USA research vessel Delaware II 21 September-4 October 1971.

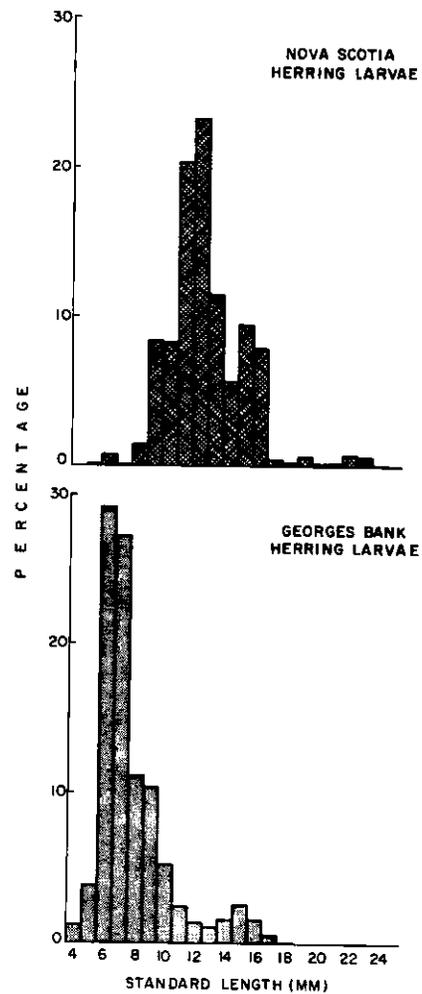


Figure 3. Length frequency distributions of larval herring captured by Delaware II 21 September-4 October 1971.